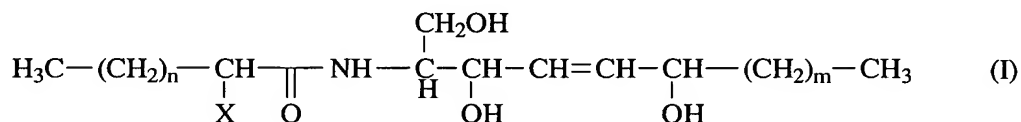


**WHAT IS CLAIMED IS:**

1. A method for preparing a reconstructed epidermis/skin equivalent from a culture medium therefor and supplemented with at least one ceramide 7 and/or 5.5 compound, comprising introducing said at least one ceramide 7 and/or 5.5 compound into the culture medium of said reconstructed epidermis/skin equivalent and/or topically applying onto the face surface of said reconstructed epidermis/skin equivalent a composition which comprises lipid lamellar vesicles incorporating at least one ceramide 7 and/or 5.5 compound.

2. The method as defined by Claim 1, said at least one ceramide 7 and/or 5.5 compound having the following structural formula (I):



in which X is a hydrogen atom or a hydroxyl group; n is an integer ranging from 19 to 29, and m is an integer ranging from 9 to 19.

3. The method as defined by Claim 2, wherein formula (I), n ranges from 21 to 27 and m ranges from 9 to 15.

4. The method as defined by Claim 3, wherein formula (I), n is 21, 22 or 23 and m is 11, 12 or 13.

5. The method as defined by Claim 4, wherein formula (I), n is 21 and m is 11.

6. The method as defined by Claim 2, wherein formula (I), X is a hydroxyl group.
7. The method as defined by Claim 2, wherein formula (I), X is a hydrogen atom.
8. The method as defined by Claim 1, said at least one ceramide 7 and/or 5.5 compound being dissolved in a solvent when introduced into the culture medium.
9. The method as defined by Claim 8, said solvent comprising ethanol or DMSO, the final ratio of solvent introduced into the culture medium not exceeding 1/1,000.
10. The method as defined by Claim 1, comprising introducing into the culture medium a combination which comprises said at least one ceramide 7 and/or 5.5 compound and at least one molecule capable of transporting said at least one ceramide compound and rendering it or them bioavailable within the reconstructed epidermis/skin equivalent from said culture medium.
11. The method as defined by Claim 10, said at least one molecule capable of transporting said at least one ceramide compound comprising BSA and/or a cyclodextrin.
12. The method as defined by Claim 11, said at least one molecule capable of transporting said at least one ceramide compound comprising BSA, introduced into said culture medium in an amount less than or equal to 100  $\mu\text{mol/l}$ .
13. The method as defined by Claim 10, said combination also comprising at least one antioxidant and at least one cellular transporter, introduced into said

culture medium in amounts of less than or equal to 50  $\mu\text{mol/l}$  and 100  $\mu\text{mol/l}$ , respectively.

14. The method as defined by Claim 13, said at least one antioxidant  
5 comprising DL- $\alpha$ -tocopherol and said at least one cellular transporter comprising L-carnitine.

15. The method as defined by Claim 2, comprising introducing into said  
culture medium lipid lamellar vesicles incorporating at least one ceramide 7 and/or  
10 5.5 compound having the formula (I).

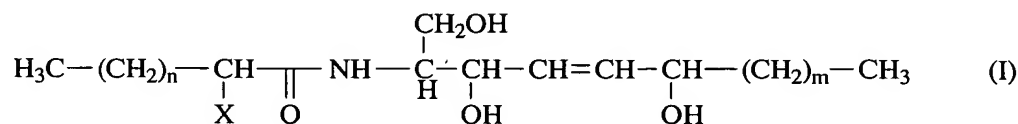
16. The method as defined by Claim 2, comprising introducing into said  
culture medium from 10 g/l to  $10^{-6}$  g/l of said at least one compound of formula  
(I).

15

17. The method as defined by Claim 2, comprising topically applying onto the  
face surface of said reconstructed epidermis/skin equivalent a composition which  
comprises lipid lamellar vesicles incorporating at least one ceramide 7 and/or 5.5  
compound of formula (I).

20

18. A composition of matter comprising a dispersion, in an external aqueous  
phase, of vesicles which comprise lipid lamellar phases separated from each other  
by hydrophilic layers, said lamellar phases comprising at least one amphiphilic  
lipid and at least one ceramide 7 and/or 5.5 compound having the following  
25 structural formula (I):



in which X is a hydrogen atom or a hydroxyl group; n is an integer ranging from 19 to 29, and m is an integer ranging from 9 to 19.

19. The composition as defined by Claim 18, said vesicles comprising  
5 niosomes or liposomes.

20. The composition as defined by Claim 18, said at least one ceramide 7  
and/or 5.5 compound of formula (I) comprising from 0.001% to 30% by weight  
of the lipid composition constituting the vesicles.  
10

21. The composition as defined by Claim 18, said at least one ceramide 7  
and/or 5.5 compound of formula (I) comprising from 0.001% to 10% by weight  
of the lipid composition constituting the vesicles.

15 22. The composition as defined by Claim 18, said at least one ceramide 7  
and/or 5.5 compound of formula (I) comprising from 0.001% to 5% by weight of  
the lipid composition constituting the vesicles.

20 23. The composition as defined by Claim 18, the weight ratio of the amount of  
lipid phase to the amount of aqueous phase in the dispersion ranging from 1/1,000  
to 300/1,000.

24. The composition as defined by Claim 18, said lamellar phases comprising  
at least one amphiphilic lipid being selected from the group consisting of the esters  
25 and/or the ethers of a polyol and of a fatty acid, whether or not  
polyoxyethylenated; the esters and/or the ethers of a fatty acid of an  
 $\alpha$ -butylglycoside; and synthetic or natural phospholipids, whether or not  
hydrogenated.

25. The composition as defined by Claim 24, said lamellar phases comprising at least one amphiphilic lipid being selected from the group consisting of mixtures of esters and/or mixtures of ethers of at least one polyol selected from the group consisting of a polyethylene glycol having from 1 to 60 ethylene oxide units,  
5 sorbitan, sorbitan bearing 2 to 60 ethylene oxide units, glycerol bearing 2 to 30 ethylene oxide units, polyglycerols having 2 to 15 glycerol units, sucroses, and glucoses bearing 2 to 30 ethylene oxide units, and at least one fatty acid comprising a linear or branched, saturated or unsaturated C<sub>5</sub>-C<sub>22</sub> alkyl radical, the number of alkyl radicals per polyol group ranging from 1 to 10.

10

26. The composition as defined by Claim 24, said lamellar phases comprising at least one amphiphilic lipid being selected from the group consisting of mixtures of esters and/or mixtures of ethers of various fatty acids of an  $\alpha$ -butylglucoside, the various fatty chains of which comprise, with respect to one another, a similar  
15 number of carbon atoms, or mixtures of mono-, di-, tri- or polyesters and/or mixtures of mono-, di-, tri- or polyethers of the same fatty acid of an  $\alpha$ -butylglucoside; said esters and said ethers of a fatty acid of an  $\alpha$ -butylglucoside comprising a fatty chain having from 8 to 24 carbon atoms.

20

27. The composition as defined by Claim 18, said lamellar phases also comprising at least one ionic amphiphilic lipid.

28. The composition as defined by Claim 27, said at least one ionic amphiphilic lipid being selected from the group consisting of:

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alkali salts of dicetyl and dimyristyl phosphate;

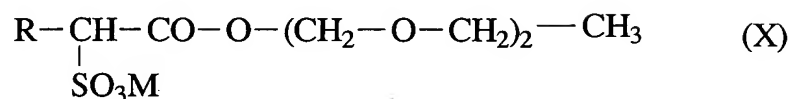
alkali salts of cholesterol sulphate;

alkali salts of cholesterol phosphate;

lipoamino acids and salts thereof, monosodium and disodium

acylglutamates, the disodium salt of N-stearoyl-L-glutamic acid;

sodium salts of phosphatidic acid;  
phospholipids;  
alkylsulphonic compounds of formula (X):



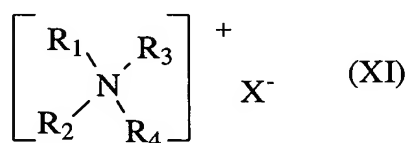
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in which R is a C<sub>16</sub>-C<sub>22</sub> alkyl radical and M is an alkali or alkaline earth metal, and mixtures thereof;

quaternary ammonium salts, and fatty amines and salts thereof.

10 29. The composition as defined by Claim 28, said at least one ionic amphiphilic lipid comprising a quaternary ammonium salt selected from the group consisting of:

quaternary ammonium salts having the following formula (XI):



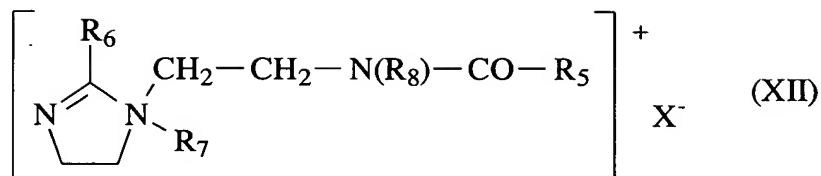
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in which the radicals R<sub>1</sub> to R<sub>4</sub>, which may be identical or different, are each a linear or branched aliphatic radical having from 1 to 30 carbon atoms, or an aromatic radical; and X is an anion selected from the group consisting of halides, phosphates, acetates, lactates, (C<sub>2</sub>-C<sub>6</sub>)alkyl sulphates, alkyl sulphonates and

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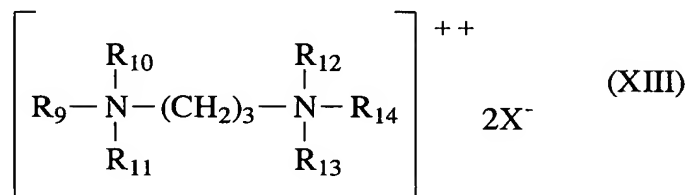
alkylaryl sulphonates;

quaternary ammonium salts of imidazolinium having the following formula (XII):



in which R<sub>5</sub> is an alkenyl or alkyl radical having from 8 to 30 carbon atoms; R<sub>6</sub> is a hydrogen atom, a C<sub>1</sub>-C<sub>4</sub> alkyl radical or an alkenyl or alkyl radical having from 8 to 30 carbon atoms; R<sub>7</sub> is a C<sub>1</sub>-C<sub>4</sub> alkyl radical; R<sub>8</sub> is a hydrogen atom or a C<sub>1</sub>-C<sub>4</sub> alkyl radical; and X is an anion selected from the group consisting of halides, phosphates, acetates, lactates, alkyl sulphates, alkyl sulphonates and alkylaryl sulphonates;

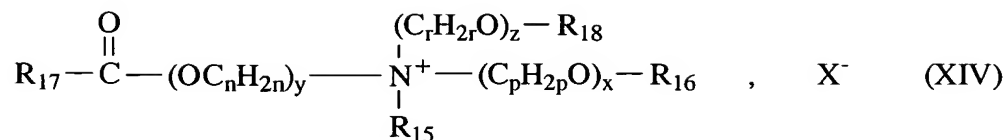
diquaternary ammonium salts having the following formula (XIII):



in which R<sub>9</sub> is an aliphatic radical having approximately 16 to 30 carbon atoms; R<sub>10</sub>, R<sub>11</sub>, R<sub>12</sub>, R<sub>13</sub> and R<sub>14</sub>, which may be identical or different, are each hydrogen or an alkyl radical having from 1 to 4 carbon atoms; and X is an anion selected from the group consisting of halides, acetates, phosphates, nitrates and methyl sulphates; and

quaternary ammonium salts comprising at least one ester function.

30. The composition as defined by Claim 29, said at least one ionic amphiphilic lipid comprising a quaternary ammonium salt containing at least one ester function and having the following formula (XIV):



in which  $\text{R}_{15}$  is a  $\text{C}_1$ - $\text{C}_6$  alkyl radical or a  $\text{C}_1$ - $\text{C}_6$  hydroxyalkyl or dihydroxyalkyl radical;  $\text{R}_{16}$  is the radical  $\text{R}_{19}$ -CO-, a linear or branched, saturated or unsaturated  $\text{C}_1$ - $\text{C}_{22}$  hydrocarbon-based radical  $\text{R}_{20}$ , or a hydrogen atom;  $\text{R}_{18}$  is a hydrogen atom, the radical  $\text{R}_{21}$ -CO-, or a linear or branched, saturated or unsaturated  $\text{C}_1$ - $\text{C}_6$  hydrocarbon-based radical  $\text{R}_{22}$ ;  $\text{R}_{17}$ ,  $\text{R}_{19}$  and  $\text{R}_{21}$ , which may be identical or different, are each a linear or branched, saturated or unsaturated  $\text{C}_7$ - $\text{C}_{21}$  hydrocarbon-based radical;  $\underline{n}$ ,  $\underline{p}$  and  $\underline{r}$ , which may be identical or different, are each integers ranging from 2 to 6;  $\underline{y}$  is an integer ranging from 1 to 10;  $\underline{x}$  and  $\underline{z}$ , which may be identical or different, are each integers ranging from 0 to 10; and  $\text{X}^-$  is a simple or complex, organic or mineral anion; with the proviso that the sum  $\underline{x} + \underline{y} + \underline{z}$  ranges from 1 to 15, that, when  $\underline{x}$  is 0, then  $\text{R}_{16}$  is  $\text{R}_{20}$ , and that, when  $\underline{z}$  is 0, then  $\text{R}_{18}$  is  $\text{R}_{22}$ .

31. The composition as defined by Claim 30, wherein formula (XIV),  $\text{R}_{15}$  is a methyl or ethyl radical;  $\underline{x}$  and  $\underline{y}$  are equal to 1;  $\underline{z}$  is equal to 0 or 1;  $\underline{n}$ ,  $\underline{p}$  and  $\underline{r}$  are equal to 2;  $\text{R}_{16}$  is the radical  $\text{R}_{19}$ -CO-, a methyl, ethyl or  $\text{C}_{14}$ - $\text{C}_{22}$  hydrocarbon-based radical, or a hydrogen atom;  $\text{R}_{18}$  is the radical  $\text{R}_{21}$ -CO-, or a hydrogen atom; and  $\text{R}_{17}$ ,  $\text{R}_{19}$  and  $\text{R}_{21}$ , which may be identical or different, are each a linear or branched, saturated or unsaturated  $\text{C}_{13}$ - $\text{C}_{17}$  hydrocarbon-based radical.

32. The composition as defined by Claim 27, the weight ratio of the amount of said at least one nonionic amphiphilic lipid to the amount of said at least one amphiphilic lipid ranging from 50/1 to 50/25.



33. The composition as defined by Claim 18, said lamellar phases comprising at least one additive selected from the group consisting of sterols, fatty-chain alcohols and diols, and fatty-chain amines and the quaternary ammonium derivatives thereof.

5

34. The composition as defined by Claim 33, said at least one additive comprising cholesterol.

10

35. The composition as defined by Claim 18, said lamellar phases further comprising at least one ceramide STAR, 1, 2, 2.5, 3, 4, 5 and/or 6.

36. The composition as defined by Claim 35, said lamellar phases further comprising the ceramides STAR and/or 4.

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37. The composition as defined by Claim 18, further comprising at least one other compound for improving the barrier function selected from the group consisting of ascorbic acid or analogues thereof, lecithins, glycosphingolipids, phospholipids, cholesterol and derivatives thereof, phytosterols (stigmasterol,  $\beta$ -sitosterol, campesterol), essential fatty acids, 1,2-diacylglycerol, 4-chromanone, pentacyclic triterpenes, ursolic acid, petroleum jelly, lanolin and mixtures thereof.

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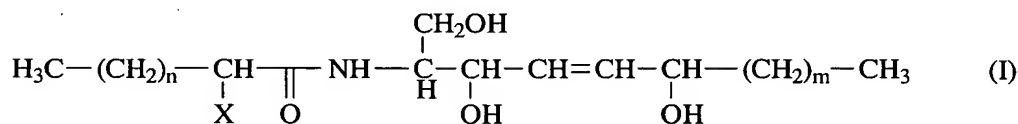
38. The composition as defined by Claim 18, further comprising at least one other bioactive agent selected from the group consisting of desquamating agents; moisturizers; depigmenting or propigmenting agents; anti-glycation agents; NO-synthase inhibitors; agents for stimulating the synthesis of dermal or epidermal macromolecules and/or preventing degradation thereof; agents for stimulating fibroblast and/or keratinocyte proliferation or stimulating keratinocyte differentiation; muscle relaxants; tightening agents; anti-pollution agents and/or

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free-radical scavengers; agents for acting on the microcirculation; agents for acting on the energy metabolism of cells; and mixtures thereof.

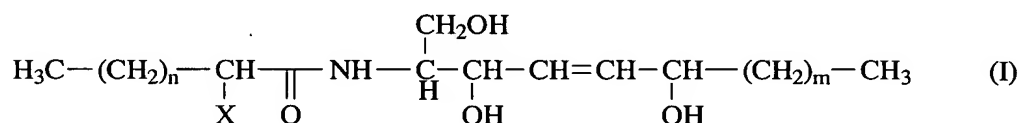
39. The composition as defined by Claim 18, further comprising at least one  
5 adjuvant selected from the group consisting of preservatives, antioxidants, solvents, fragrances, odor absorbers, neutralizing agents, sunscreens, polymers, emulsifiers and coemulsifiers, dyestuffs, and mixtures thereof.

40. A regime or regimen for reinforcing the barrier function of normal human  
10 epidermis, and/or improving the barrier function of an epidermis exhibiting a deficiency in 6-hydroxy-4-sphingenine-base ceramides, including that of dry skin, or of rough and/or damaged and/or aged and/or sensitive skin, and/or re-establishing or maintaining the integrity of the stratum corneum, and/or improving the surface appearance and/or the moisturization of the skin, and/or  
15 improving and/or maintaining the lipid content of human epidermis, comprising topically applying thereon a thus-effective amount of a composition of matter comprising a dispersion, in an external aqueous phase, of vesicles which comprise lipid lamellar phases separated from each other by hydrophilic layers, said lamellar phases comprising at least one amphiphilic lipid and at least one ceramide  
20 7 and/or 5.5 compound having the following structural formula (I):



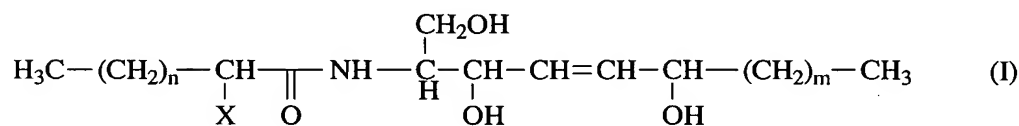
in which X is a hydrogen atom or a hydroxyl group; n is an integer ranging from 19 to 29, and m is an integer ranging from 9 to 19.

41. A regime or regimen for the treatment of atopic skin, comprising topically applying thereon a thus-effective amount of a composition of matter comprising a dispersion, in an external aqueous phase, of vesicles which comprise lipid lamellar phases separated from each other by hydrophilic layers, said lamellar phases comprising at least one amphiphilic lipid and at least one ceramide 7 and/or 5.5 compound having the following structural formula (I):



in which X is a hydrogen atom or a hydroxyl group; n is an integer ranging from 19 to 29, and m is an integer ranging from 9 to 19.

42. A regime or regimen for rendering human skin more attractive or moisturizing same, comprising topically applying thereon a thus-effective amount of a composition of matter comprising a dispersion, in an external aqueous phase, of vesicles which comprise lipid lamellar phases separated from each other by hydrophilic layers, said lamellar phases comprising at least one amphiphilic lipid and at least one ceramide 7 and/or 5.5 compound having the following structural formula (I):

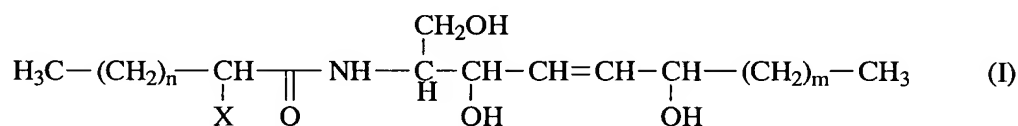


in which X is a hydrogen atom or a hydroxyl group; n is an integer ranging from 19 to 29, and m is an integer ranging from 9 to 19.

43. The method as defined by Claim 17, the amount of composition topically applied onto the face surface of the epidermis in culture ranging from 0.5  $\mu$ l to 10  $\mu$ l per  $\text{cm}^2$  of reconstructed epidermal surface.

5 44. The method as defined by Claim 1, said reconstructed epidermis/skin equivalent comprising EPISKIN™.

45. A reconstructed epidermis/skin equivalent comprising a skin barrier function-improving amount of at least one ceramide 7 and/or 5.5 compound  
10 having the following structural formula (I):



in which X is a hydrogen atom or a hydroxyl group;  $n$  is an integer ranging from 19 to 29, and  $m$  is an integer ranging from 9 to 19.

15

46. The reconstructed epidermis/skin equivalent as defined by Claim 45, wherein formula (I), X is a hydrogen atom.

47. The reconstructed epidermis/skin equivalent as defined by Claim 45,  
20 wherein formula (I), X is a hydroxyl group.